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Energy Expenditures of Canadians, 1969-1982

THE ELDERLY AND ENERGY USE

by

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ENERGY EXPENDITURES OF CANADIANS, 1969-1982

ABSTRACT

The energy consumption of the elderly from 1969 to 1982 is examined through the use of Family Expenditure data. The elderly spent much less than younger age groups on personal transportation energy but only slightly less on in-home energy. Because of lower total expenditures, these in-home energy costs took a much larger share of their total budgets. The recent rises in energy costs have affected the elderly more dramatically in this regard. Also the per capita and per room energy costs for the elderly were higher, and the elderly appear to be less likely to have changed heating fuel types to reduce costs.

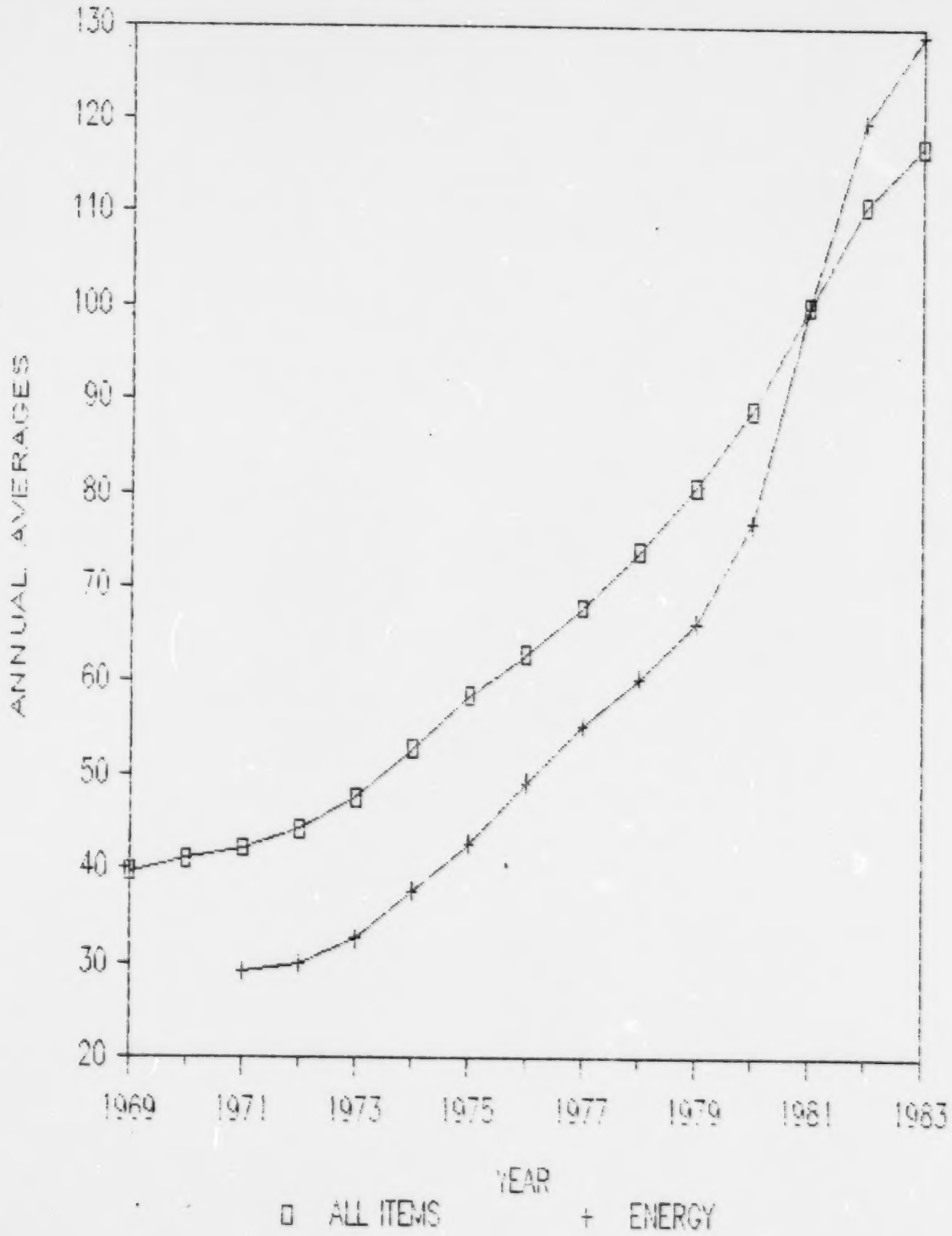
BACKGROUND

Buying energy in the seventies became an expensive proposition. For decades household lifestyles were established in patterns based on the availability of cheap fuel. However, the mid- to late 1970's brought rapidly escalating energy prices, especially for oil but also for electricity and gas. The purpose of this paper is to assess the impact of these increases on the elderly through an analysis of their direct expenditures for energy. It includes for context a background section on the needs and experiences of the elderly with energy in the home and for transportation.

For the elderly, life has been very changeable and in some ways perversely confusing. Many of today's senior citizens grew up when most activities were powered by people or animals. Lives were enjoyed with minimal use of fossil fuels. Then came a prolonged era of major technological upheaval. Within a short few decades ordinary family life had been transformed to one highly dependent on a wide-range of motor-driven machines, electrical lighting and centralized heating powered by fossil fuels. In more recent years the good life has come to mean the availability of many machines and gadgets in the home and high mobility through private means of transportation. However, once this new pattern was well established, the whole thing was turned over again. The cheap power to run all the gadgets and the automobile suddenly evaporated as fuel prices jumped. Figure 1 traces the rise in the Consumer Price Index for energy from 1971 to 1983. Major shifts in price increases occurred in 1973 and 1979. Overall, the major trend changed from fairly stable prices before 1973 to rapidly increasing ones afterwards.

FIGURE 1

CONSUMER PRICE INDEX AND ENERGY PRICE INDEX 1969 to 1983



For the elderly such commodity increases are especially difficult to handle because of the nature of their incomes. If prices increase, workers in the labour force seek relief through higher wage demands. Their aim is to maintain or to continue to enjoy rising living standards despite rising costs. However, much of the income of the elderly comes from government pensions and old-age supplements. Traditionally, the value of these transfer payments has been fixed for lengthy periods of time at fairly meager levels. However, the elderly in Canada received some relief in the mid-1970's when dramatic energy price increases fueled a dramatic rise in general prices and the federal government began indexing pensions to the general Consumer Price Index. Some other income sources of the elderly were not so accommodating. Private pensions and investment-based incomes generally did not keep pace. Many elderly, therefore, felt the twin pressures of limited budgets and rising prices. Energy prices, in particular, were a problem because increases in their prices have been greater than general CPI increases since 1978.

IMPORTANCE OF ENERGY TO THE ELDERLY

Energy is an important commodity for the elderly. When prices for energy rise, rising expenses for home heating are largely unavoidable, as proper temperature levels cannot be compromised. As people age, disabilities, diseases, prescription medicines and a general decline in metabolic rate all weaken the body's natural defences and increase vulnerability to heat and cold. The elderly can become ill in homes at temperatures below 18 degrees celsius. If an elderly person is weak, even less exposure is required to produce hypothermia. It has been recommended that the elderly take precautions if the room temperature is below 21 degrees celsius. The costs of keeping a home at these temperatures are substantial (Avery, 1984:43-44).

Heat stress is as dangerous as hypothermia. The elderly with circulatory problems, kidney problems, respiratory illnesses, skin diseases, obesity, suffering from a fever, taking medication or consuming alcohol can suffer problems at high temperatures. These problems range from heat exhaustion to heat stroke or heat-induced heart failure and stroke. It is recommended that

elderly people keep at least one room cool in summer. Air conditioners, however, require substantial initial investments to purchase and significant ongoing financing of energy to operate (Avery, 1984:45).

Outside the home energy needs are no less real. Transportation is the link between people and the activities in which they are engaged. This is as true for the senior citizens as for any other adult in the community. Myths about declining lifestyles in old age propose that the elderly prefer not to travel very much. The myth has a theoretical basis in the hypothesized life-cycle pattern and its definition of the relevant environment of the individual. This theory postulates that in a normal life progression the baby starts by recognizing his or her relevant environment as the nursery. As the child grows the environment expands to the house, the yard, the neighbourhood, and community. Definitions beyond these areas depend upon the course a person's life takes. Once the person becomes old, however, it is thought that the outward progression reverses and the relevant environment gets smaller and smaller. The entire process can be thought of as a series of concentric circles in which the person starts in the middle and moves out to progressively larger spheres until old age, when the person begins to move back towards the centre. In the end the elderly person's environment becomes his or her room in a house or nursing home. (See, for example, Cumming and Henry, 1961.)

Unfortunately, the theory does not recognize the importance of maintaining social contacts for life satisfaction and has an unrealistic view of the elderly's lifestyle or at least of the elderly's desired lifestyle. It is a global theory lacking in individual perspective. It also may simply be antiquated as many of the physical and economic limitations of lifestyle for the elderly have been lifted.

Transportation is a key factor in allowing the elderly to maintain contacts in a larger environment. Studies have found a strong and consistent relationship between access to transportation and life satisfaction (McPherson, 1983). Whereas a century ago, transportation was not a critical factor in meeting a person's needs, today it is. Community services and

activities in the modern-day North American community are not closely clustered together within a reasonable walking distance, but instead are located to serve as large an area as possible (Robson, 1982). The change in size of the area in which people associate in their community poses special problems for the elderly as, particularly in North America, the dominant form of transportation is the automobile.

The elderly do not end all their other activities with the cessation of employment. They must still bring food and other goods home from the store, go to church and meetings, go to the doctor, the dentist and the lawyer, as well as enjoy recreational activities and visit friends and family. Travel needs associated with employment are at least in part replaced by needs created by additional leisure time. The reality of these needs does not correspond with the withdrawal predicted by the life cycle disengagement theory.

A senior citizen's ability to meet transportation needs is conditioned by economic, social and physical circumstances. The elderly predominantly use the automobile, public transportation, taxis and walking to get around. In this century the automobile has become the most attractive form of transportation, but the cost to run and maintain an automobile and increased physical problems experienced by the elderly in many cases rule out the car as an alternative. Many provinces impose compulsory driver's tests on seniors and effectively constrain the operation of cars by many. In addition, many elderly women cast their lot in younger life by never learning to drive, instead choosing to rely on their husbands. In widowhood they frequently choose not to undertake to learn the skills required to get a license. However, this is a pattern of the past, and most younger women today do learn to drive and enjoy it. This new behaviour norm would suggest that in the future more seniors will drive.

Financial constraints and the inability to drive make public transit a likely alternative. This form of transportation has many limitations, however. It does not always easily go to where the elderly wish to go. In smaller communities and cities where many elderly live it operates on restricted hours and not on Sundays. With high steps and sometimes heavy exit doors,

buses and street cars may be difficult or impossible to use by the elderly with physical limitations. It is also difficult to carry packages on and off buses, particularly if handrails must be used for entrance and exit. Senior citizens need a place to sit down while they wait for a bus, preferably somewhere protected from the cold and the rain. The heat and the cold which characterize the Canadian climate pose further difficulties for the elderly when using public transit, and the ice and the snow on the walk to the bus stop in winter can make the whole trip dangerous, inconvenient and uncomfortable. Finally public transit is simply not available in most rural areas.

Taxis are much more convenient than buses but are also much more expensive. There are reduced taxi fares for seniors in some areas, e.g., the Saskatchewan government does make some provisions for free service in urban areas. The cost of such a free service for the elderly population in general, however, make it unlikely that similar subsidized service will become universal.

The elderly also have the option of walking so long as their destination is within a distance suited to their capabilities. Housing developments designed specifically for the elderly recognize the importance of walking for elderly people to get around and are often located in close proximity to the services they require. Nonetheless, walking in the heat of summer and the cold of winter is neither appealing nor practical given the health problems of some elderly. A reliance upon walking also limits the elderly's horizon or the environment within which they can interact and may impose the life cycle regression theorized.

Special transportation services are sometimes available for the senior citizens who have physical disabilities and cannot use conventional transportation. These services do not really resolve the problems of the elderly who have mild physical impairment or who simply do not have the economic resources to pay bus fares even at reduced rates.

Finally, the elderly's transportation needs extend beyond the local community. Canadians are highly mobile. It is necessary for the elderly who

wish to maintain personal contact with family and friends to use long distance transportation facilities. The private automobile is still the preferred mode for most intercity trips but public transit is also often used. Airlines, buses and railways offer special rates and packages for elderly travelers and assistance is usually available for passengers with physical mobility problems. The cost factor, however, is still prohibitive for many elderly people.

Senior citizens must have their transportation needs met if they are to be able to meet most of their other needs by acquiring goods and services and to maintain social ties. However, the need for transportation extends well beyond the weekly trip to the grocery store and the occasional visit to the doctor. Transportation is the means by which the elderly get to all the activities they wish to pursue and thereby achieve a lifestyle which provides satisfaction.

Clearly then energy for both in-home and transportation uses is an important commodity for the elderly. Also, quite clearly the cost of this commodity has risen dramatically in the last ten years. The following discussions involves the results of the analysis of direct energy expenditures of the elderly through this period to determine how the burden of these price increases has affected them.

SOURCE OF DATA

The data for this study was obtained from the Family Expenditure surveys carried out by Statistics Canada in 1969, 1972, 1974, 1976, 1978 and 1982. The data from the same eight cities included in all six surveys were used. These cities are St. John's, Halifax, Montreal, Ottawa, Toronto, Winnipeg, Edmonton and Vancouver. Two data sets were developed. In the main one for this study, further selection of households was done to include in the sample only those families who could affect their own energy consumption significantly by housing and heating system modifications and also would be directly and immediately affected by rising energy prices. These would be those households who paid directly for their own energy in the home. This is not the case for

most apartment dwellers in Canada. So the final sample of households included only those who had non-zero in-home expenditures, who paid directly for their own heat and utilities and who lived in single, and semi-detached, duplex, town or row houses.(1)

In order to focus on the spending of the elderly, the resulting sample of energy buyers was further subdivided by age of the head of those households as defined in the Family Expenditure studies. All those households with head over the age of 64 were classified as elderly.

The selection into the sample of only non-apartment dwelling energy buyers tends to bias the sample towards those who can afford to maintain their own homes. This group is likely to spend more on energy. Also on average, their incomes are likely to be higher than those of household who are not in the sample. However, this may not be true at the individual level especially for many of the elderly who may own homes because of adequate pre-retirement incomes and in spite of much lower current incomes.

A second data set was developed which included all one- and two-person households with head 45 years of age and older. Its main use as reported later is to compare elderly households with those with similar needs in terms of size and stage of family life who are not yet over sixty-five. However, no restrictions were placed on this second data set regarding housing characteristics.

It is impossible from expenditures data to identify the use being made of energy in the home. If an electricity bill is paid, it is impossible to sort out how much is being used for each of the functions of cooking, lighting, running appliances and heating. Similarly, if natural gas is used for heating and cooking in the home, there is no way of determining what proportion is allocated to each function. So in the following analysis all in-home energy uses are combined into one category and used as one measure of energy expenditures. Only at this aggregate level is there any measure of accuracy.

The other energy use expenditure measure used in this study is for personal, private car or truck fuel. This is usually for gasoline, but also

includes other car and truck fuels. Business portions of energy expenditures for both in-home and transportation energy have been removed. Again only direct energy expenditures for car and truck transportation are used since private transportation is the preferred and often the only feasible means of transportation. Also it is impossible to accurately estimate the energy cost component of fares for public transit.

EXPENDITURES FOR ENERGY

In 1982, all households paying for direct energy in their homes spent an average of $1265. In 1969 the average figure was $306. This is an increase of 313% over the 13-year period. In their vehicles in 1982 these households had average expenditures of $1083 versus $231 in 1969 for an increase of 369%. The data for each of the six survey years for all households in the sample (and for those 65 years of age and older) are presented in Table 1 and Figures 2 and 3.

The shape of the curve tracking the expenditure increases indicate several upward shifts in rate of increase of expenditures. These can be seen in the slope of the lines joining the points. The curve is almost flat between 1969 and 1972. Between 1972 and 1974 it shifts upward, and again between 1974 and 1976. About the same slope is maintained between 1976 and 1978 for all households for in-home energy but flattens for car/truck fuel indicating some moderation in price increases and/or consumption. The next time gap covers a four-year period rather than two so care must be exercised in assessing inter-survey year trends. However, despite this greater time gap a very dramatic increase occurred between 1978 and 1982. This pattern generally follows the pattern of energy price increases and also reflects the impact of conservation activities in the mid- to late 1970's.

The increases for the elderly households also included in the table and figures were quite similar in nature to those for the total sample of households. The major difference in absolute levels is seen in vehicle operating expenditures. Although the absolute level of expenditures were much lower,

TABLE 1

AVERAGE DOLLAR EXPENDITURE FOR ENERGY OF HOUSEHOLDS IN SAMPLE*

BY AGE OF HEAD 65 YEARS AND OVER, 8 CITIES, 1969-1982

	In-Home Energy			Car & Truck Fuel Energy			Sample Size	
Age of Head	65-74	75+	All	65-74	75+	All	65-74	75+
Year								
1969	276	253	306	117	46	231	255	105
1972	332	315	357	127	33	269	204	88
1974	376	400	451	175	94	369	281	123
1976	571	611	610	268	128	506	194	89
1978	721	765	765	291	149	560	182	83
1982	1160	1151	1265	599	304	1083	173	90
% Change 1969-1982	320.3	354.9	313.4	412.0	561.0	368.8		

* See text for sample construction constraints.

FIGURE 2
AVERAGE DOLLAR EXPENDITURES FOR IN-HOME ENERGY OF HOUSEHOLDS IN SAMPLE
BY AGE OF HEAD 65 YEARS AND OVER, 8 CITY, 1969 - 1982

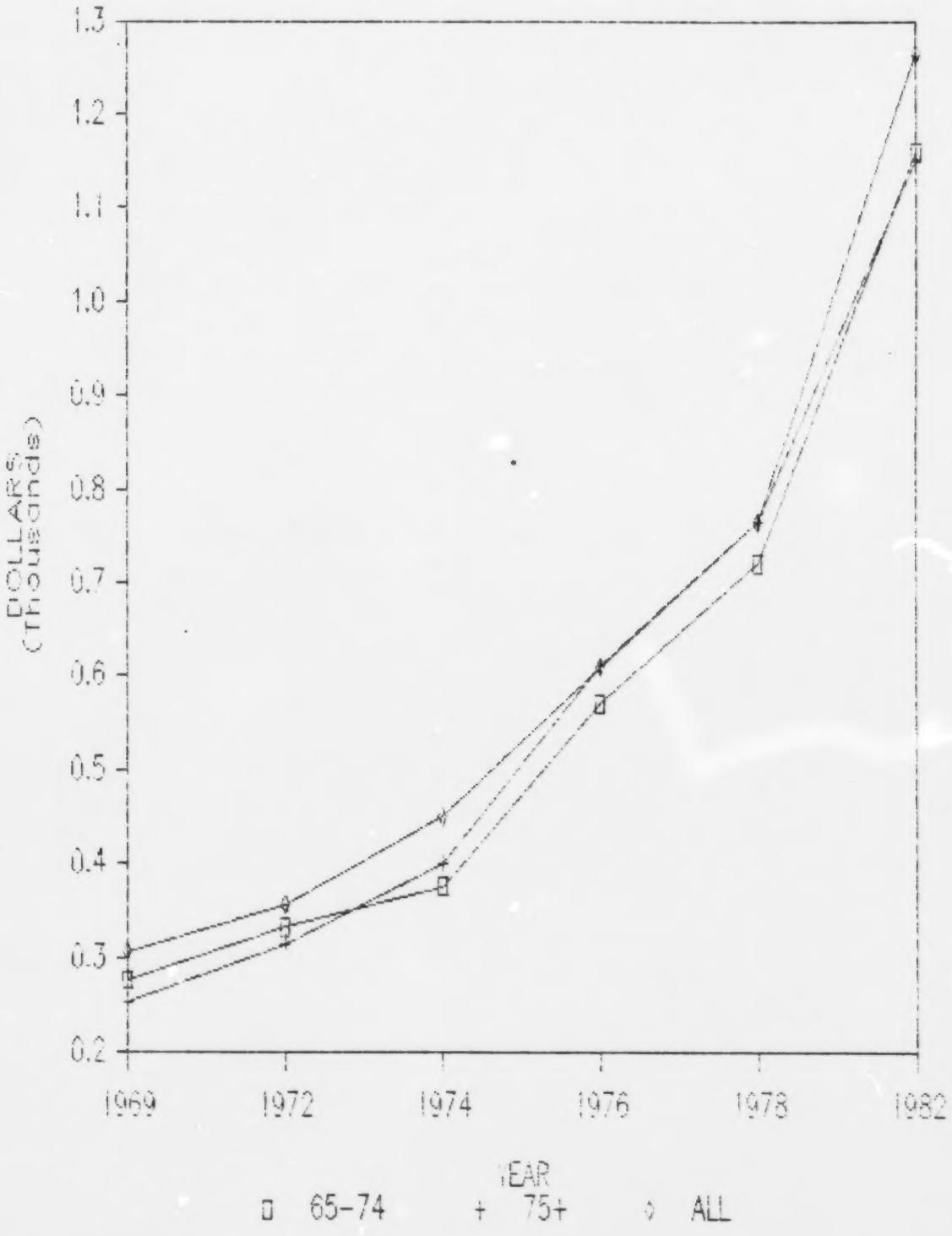
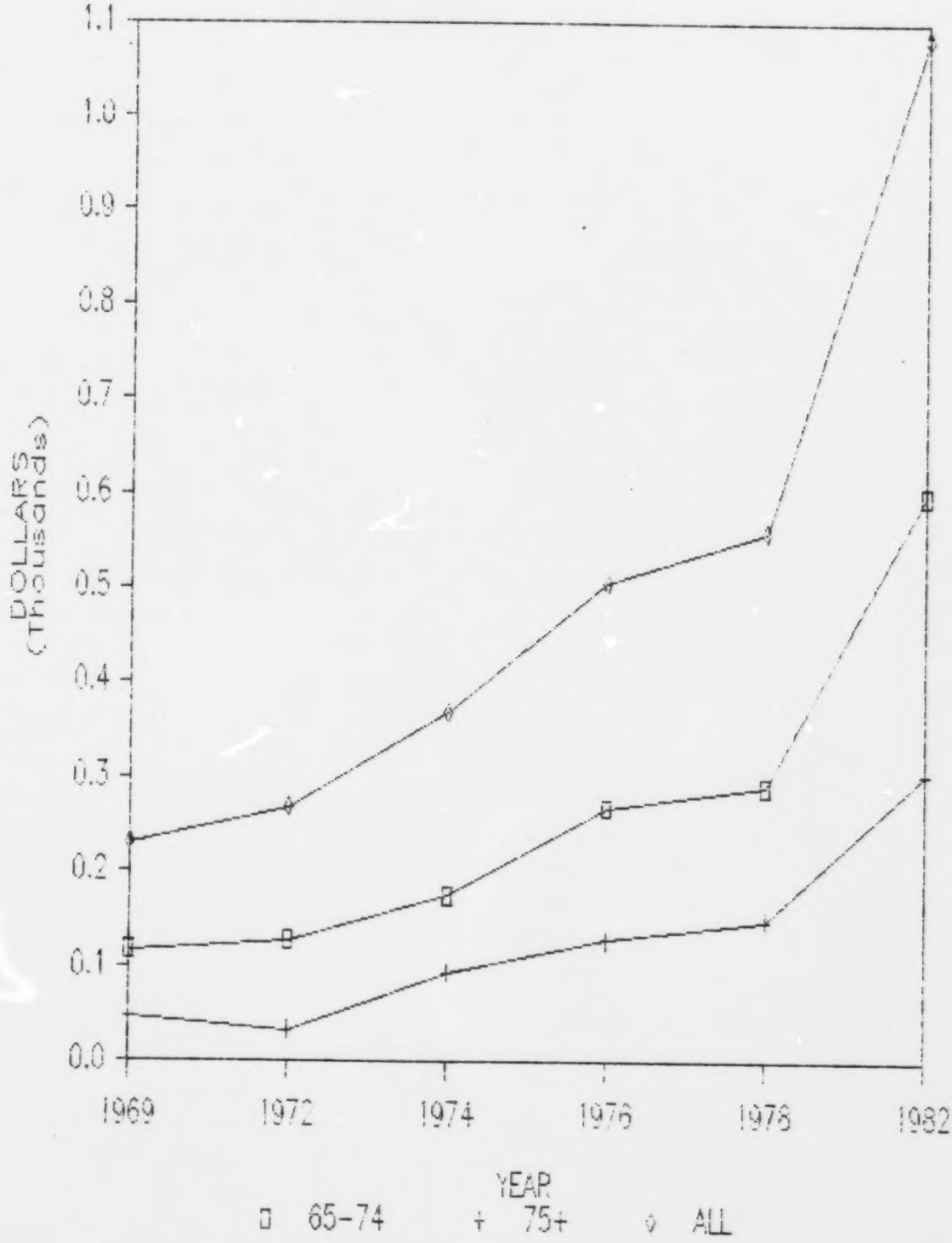


FIGURE 3
AVERAGE DOLLAR EXPENDITURES FOR CAR AND TRUCK FUEL ENERGY OF HOUSEHOLDS IN SAMPLE BY AGE OF HEAD 65 YEARS AND OVER, 8 CITY, 1969 - 1982



the increases over time followed the same pattern and large percentage increases were, in fact, experienced over the 13-year period. The elderly in this sense were significantly affected by transportation energy price increases.

In the home, the elderly had expenditures much closer to the average for all households. The patterns of increase were also quite comparable, but again the elderly had larger increases in percentage terms between 1969 and 1982 in these energy expenditures.

The increased costs for energy occurred in conjunction with and certainly played a major role in creating a period of very rapid inflation. Wages and salary increases assisted most people in keeping up with the increased living costs. Indexing of pensions to the cost of living was introduced in the mid-1970's in response to the particular hardships experienced by many elderly on fixed government income support programmes. Therefore, it is important to understand what impact these modifications of income might have had on the burden of funding these increased energy costs within the household.

To study this burden, the in-home and transportation energy costs are presented in terms of the percentage of total expenditures they accounted for in each year. These percentages indicate how much of total budgets were allocated to energy consumption and, therefore, not available for other consumption uses. These results are included in Table 2 and Figures 4 and 5. The much heavier burden of energy costs borne by the elderly becomes much more obvious now. Although the elderly spent less than the average household on energy, they spent a much higher proportion of their total budgets. Combining both uses of energy, all sample households spent 6.5% of total expenditures for energy while those aged 65-74 spent 8.8% and those 75 and over 9.7%. Moreover, despite the rapid rise in energy prices, the proportion of total expenditures allocated to energy by all households in the samples rose only by a total of 1.2% over the 13-year period. However, the elderly had to re-allocate about 2.4% or twice the average from elsewhere in their budgets to cover the price hikes.

TABLE 2

ENERGY AS A PERCENTAGE OF TOTAL EXPENDITURES BY AGE OF THE HEAD OF HOUSEHOLD 65 YEARS AND OVER, 8 CITIES, 1969-1982

	In-Home Energy			Car & Truck Fuel Energy		
Age of Head	65-74	75+	All	65-74	75+	All
Year						
1969	4.5	6.6	3.0	1.9	1.2	2.3
1972	4.8	7.1	2.9	1.8	0.8	2.2
1974	4.5	5.9	2.7	2.1	1.4	2.2
1976	5.2	6.5	2.9	2.4	1.6	2.4
1978	5.8	7.9	3.2	2.3	1.8	2.3
1982	5.8	7.7	3.5	3.0	2.0	3.0
Change 1969-1982	1.3	1.1	0.5	1.1	1.2	0.7

FIGURE 4
IN-HOME ENERGY AS A PERCENTAGE OF TOTAL EXPENDITURES
BY AGE OF THE HEAD OF HOUSEHOLDS 65 YEARS AND OVER, 8 CITY, 1969 - 1982

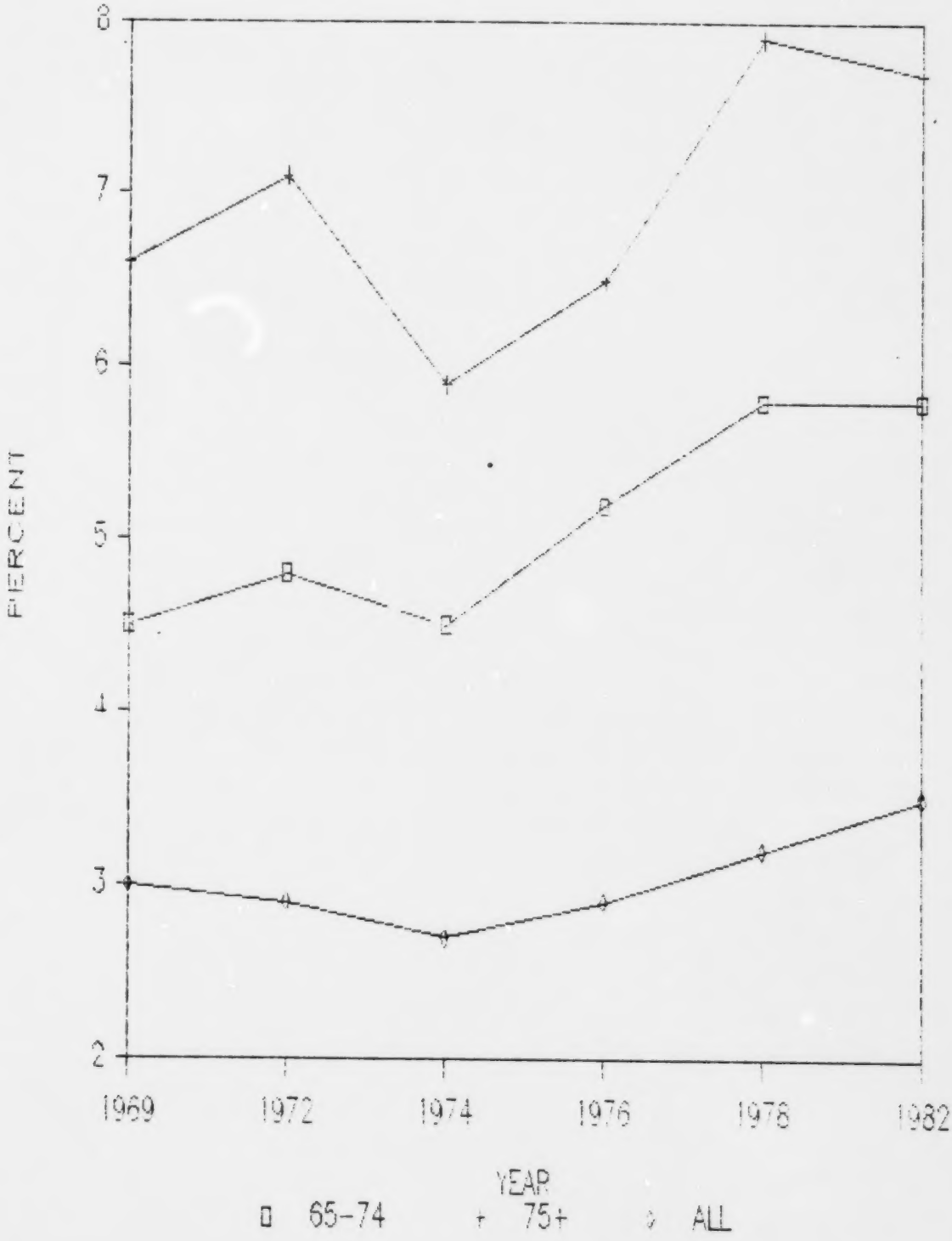
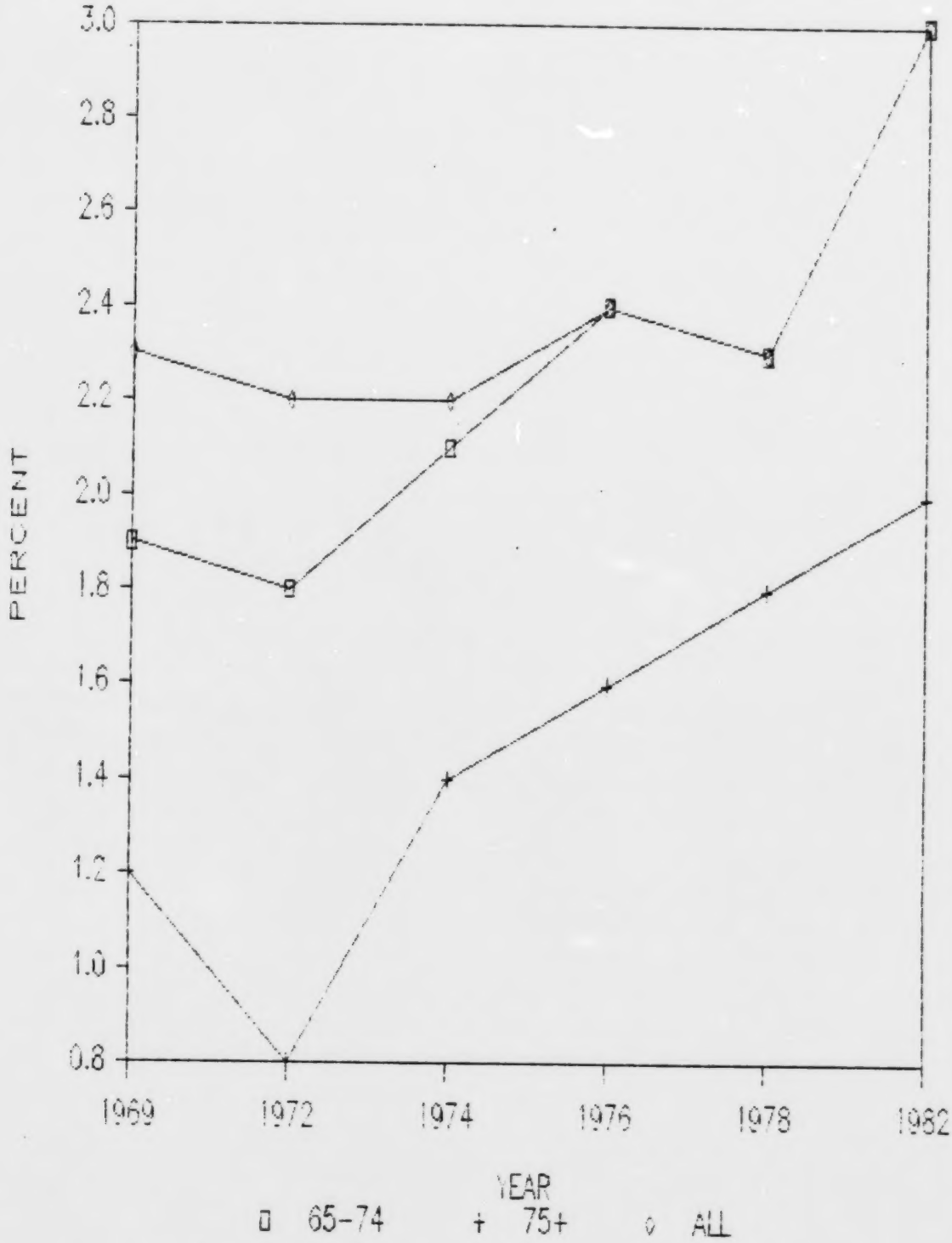


FIGURE 5
CAR AND TRUCK FUEL ENERGY AS A PERCENTAGE OF TOTAL EXPENDITURES
BY AGE OF THE HEAD OF HOUSEHOLD 65 YEARS AND OVER, 8 CITY, 1969 - 1982



Energy use is clearly age-related. Table 3 presents the expenditures on energy by age of household head from 1969 to 1982. In Figure 6 the 1982 figures are graphed by age of head in dollars. Energy use in the home rises to reach a peak in the middle years. These are the years when older children are still at home or beginning to leave. Housing accommodation is usually at its maximum size and utilization, and, therefore, energy costs are high. Percentages of budgets (Figure 7) allocated during this period also rise, despite the general increase in total incomes and total expenditures over the same ages. The total energy costs for in-home uses then drop after age 65. However, because total incomes take a much greater drop, energy as a percentage of budgets continues to climb in great leaps. The importance of energy to households is supported by the prominent position it occupies in family budgets. With rising incomes over the family lifecycle, the proportion allocated to energy in the home increases. Then despite falling incomes in later life, corresponding cutbacks in energy use, in particular in the home, do not occur so that the budget share for in-home energy continues to increase.

Transportation direct energy expenditure increases are of a different nature. The presence of young children appears to stabilize personal travel expenditures and even reduce the percentage of budgets spent for car and truck fuels. However, once the children are older these costs rise, probably because of the increased activity of these children outside the home and especially their acquisition of driving licences. Then at age 65 there is a very sudden drop in dollar expenditures which is followed by another drop in dollar expenditures for the over 75 group. This latter drop is large enough to result in a decline in percentage of total expenditures for car and truck fuels as well. Today's household with head over 75 is usually composed of a single women living alone. Many of these women never did drive. If they did or if there is a male head of household, health and physical activity restrictions at this advanced age as well as provincial licensing requirements begin to restrict car use. However, the more moderate decline at age sixty-five seems to be more closely related to a decline in total expenditures and income restrictions as percentage expenditures do not decline.

TABLE 3
ENERGY EXPENDITURES BY AGE OF HOUSEHOLD HEAD
8 CITIES SAMPLE, 1969-1982

Age of Head	<30	30-44	45-64	65-74	75 & Over
	In-Home Energy				
Dollar Expenditures					
1969	267	323	311	276	253
1972	309	367	369	332	315
1974	386	463	474	376	400
1976	538	632	623	571	611
1978	627	775	807	721	765
1982	1000	1275	1348	1160	1151
% Change 1969-1982	274.5	294.7	333.4	320.3	354.9
Percentage of Total Expenditures					
1969	2.9	2.9	2.8	4.5	6.6
1972	2.6	2.6	2.7	4.8	7.1
1974	2.4	2.5	2.7	4.5	5.9
1976	2.7	2.7	2.8	5.2	6.5
1978	2.8	2.9	3.1	5.8	7.9
1982	3.1	3.2	3.5	5.8	7.7
Change 1969-1982	0.2	0.3	0.7	1.3	1.1
	Car & Truck Fuel Energy				
Dollar Expenditures					
1969	273	251	247	117	46
1972	285	292	307	127	33
1974	395	376	427	175	94
1976	515	537	564	268	128
1978	542	613	627	291	149
1982	1167	1126	1202	599	304
% Change 1969-1982	327.4	348.6	386.6	412.0	561.0
Percentage of Total Expenditures					
1969	3.0	2.2	2.2	1.9	1.2
1972	2.4	2.1	2.3	1.8	0.8
1974	2.5	2.1	2.4	2.1	1.4
1976	2.6	2.3	2.5	2.4	1.6
1978	2.4	2.3	2.4	2.3	1.8
1982	3.6	2.8	3.2	3.0	2.0
Change 1969-1982	0.6	0.6	1.0	1.1	1.2

FIGURE 6
ENERGY EXPENDITURES IN DOLLARS BY AGE OF HOUSEHOLD HEAD,
8 CITIES SAMPLE, 1982

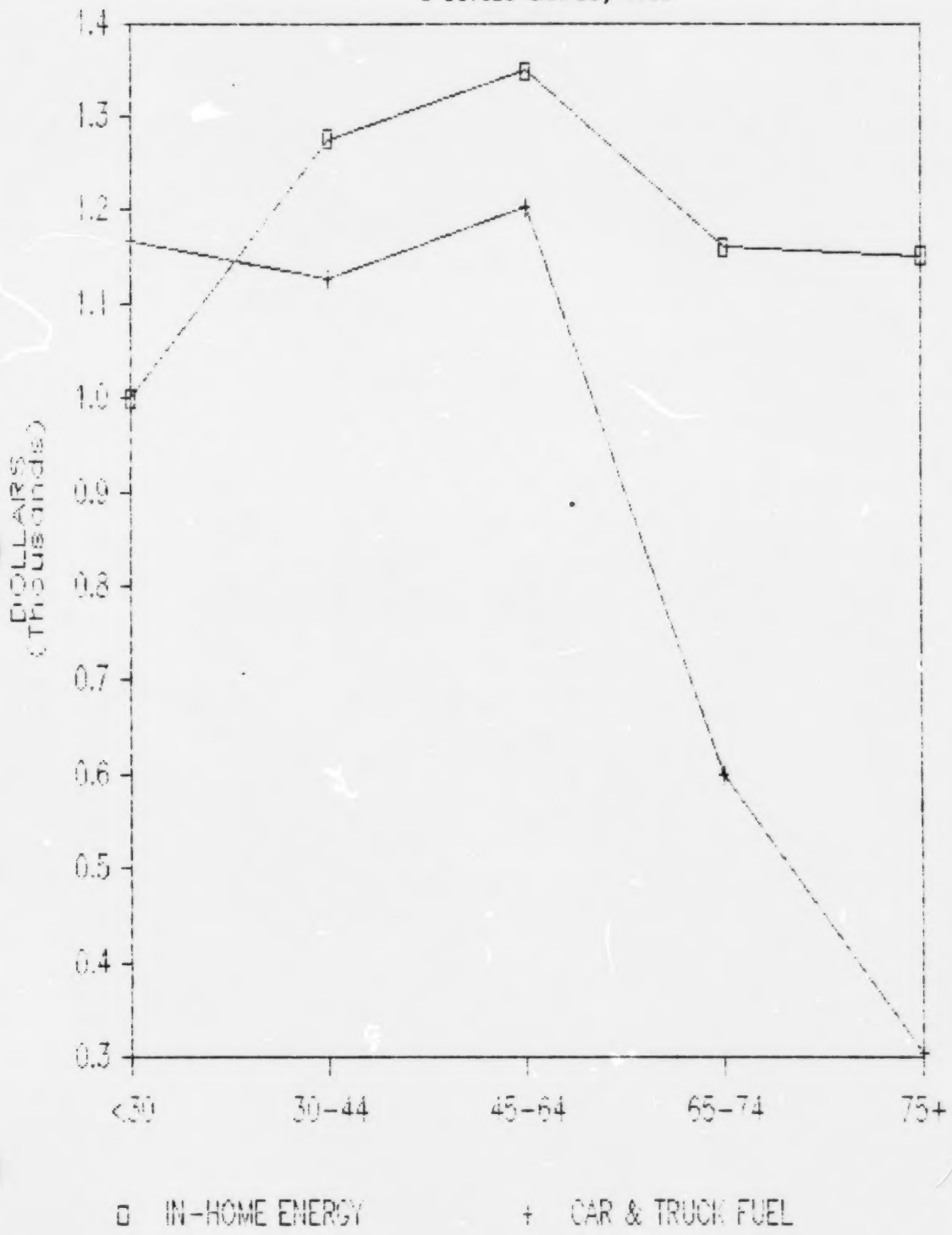
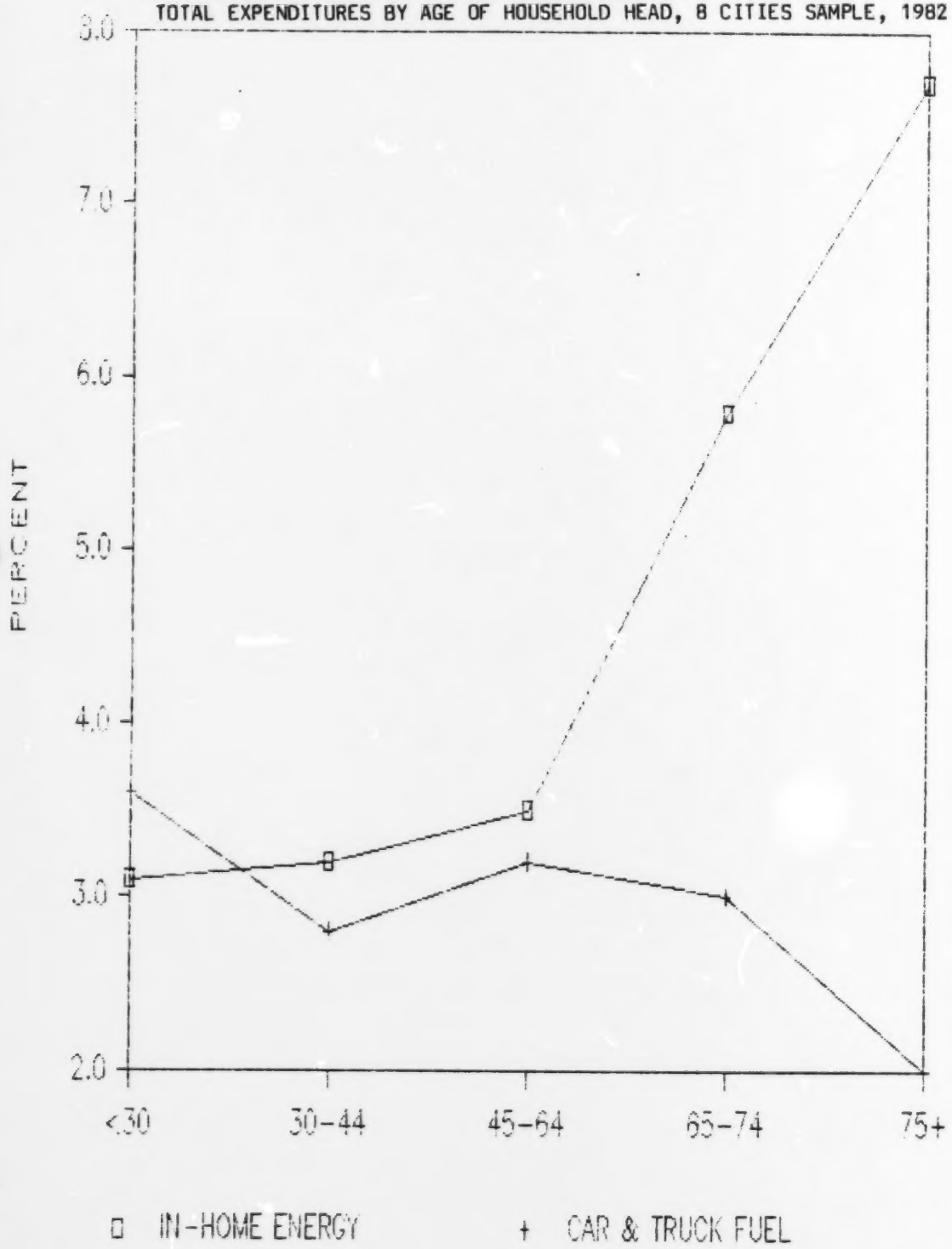


FIGURE 7
IN-HOME ENERGY AND CAR AND TRUCK FUEL ENERGY AS A PERCENT OF TOTAL EXPENDITURES BY AGE OF HOUSEHOLD HEAD, 8 CITIES SAMPLE, 1982



AGE AND FAMILY SIZE

It is difficult to sort out with this data set the relative effects of age versus family size on these energy expenditures. The two factors are strongly linked through the family life cycle process. So it is hard to tell if differences in expenditures between the elderly and non-elderly can be accounted for more by age-related factors or by the family size differences usually jointly experienced. A partial answer to the relative impact of each of the two factors can be obtained by examining data from another study of the elderly and their expenditures (see Heslop forthcoming). In this study, the sample from the Family Expenditure Survey data was not selected to include only those who paid directly for their energy but rather was selected by household size and age of head characteristics. The sample included all those one- and two-person households with heads age 45 and over. Some of these households did not pay for their in-home energy themselves, but the predominant pattern for married couples especially is that they did. It should be noted that for some years the oldest group sample sizes are small. Therefore, care should be exercised in using the results. Only general trends rather than the exact amounts of expenditures should be sought concerning this group.

The expenditures of these households as seen in Table 4 indicate that family size is very important to energy consumption. Regardless of age, one-person households spent less than two-person households. This is especially true for transportation energy. There is probably a fairly high minimum in-home energy expenditure required to keep any household, even the most meager. Whereas this minimum is substantial in the case of energy in the home, it is zero for operating an automobile. Also, it is understandable that the upper limit on such energy expenditures would also be more flexible for the automobile than for in-home energy. Therefore, automobile energy expenditures are generally found to be more variable across families than are in-home expenditures.

The second major observation from this data is that regardless of household size, dollar expenditures for energy in the home are lower but percentages of total expenditures are higher for households with an elderly head than

TABLE 4

ENERGY EXPENDITURE OF ONE- AND TWO-PERSON HOUSEHOLDS
WITH HEAD 45 YEARS OF AGE AND OVER BY AGE OF HEAD AND HOUSEHOLD SIZE
1969-1982, 8 MAJOR CITIES

Age of Head		Type of Household												Sample Sizes					
		Unattached Individuals						Married Couples						Unattached Individuals			Married Couples		
		45-64		65-74		75 & Over		45-64		65-74		75 & Over		45-64	65-74	75 & Over	45-64	65-74	75 & Over
		$	%	$	%	$	%	$	%	$	%	$	%						
In-Home Energy																			
Year	1969	90	1.9	111	3.8	87	4.0	246	2.5	215	3.7	173	4.1	215	137	103	292	150	79
	1972	101	1.9	120	3.4	111	3.9	239	2.3	269	3.6	233	5.2	179	144	76	227	124	56
	1974	133	1.7	163	3.5	133	3.9	317	2.2	267	3.7	297	4.5	273	206	140	256	220	94
	1976	184	1.7	222	4.1	195	4.1	419	2.2	362	3.4	341	5.4	180	119	84	245	153	65
	1978	177	1.5	355	4.8	309	6.0	565	2.8	495	3.9	382	4.4	169	123	92	266	135	45
	1982	436	2.5	469	4.2	381	3.9	963	3.1	769	3.8	858	4.9	215	122	111	271	154	74
Transportation Energy																			
Year	1969	68	1.5	22	0.7	2	0.1	236	2.4	96	1.6	40	1.0						
	1972	66	1.2	16	0.5	6	0.2	233	2.2	124	1.6	27	0.6						
	1974	120	1.6	38	0.8	4	0.1	334	2.3	150	2.1	93	1.4						
	1976	159	1.5	62	1.1	12	0.3	362	1.9	232	2.2	95	1.5						
	1978	150	1.3	69	0.9	15	0.3	417	2.1	293	2.3	102	1.2						
	1982	377	2.1	123	1.2	107	1.1	875	2.8	508	2.5	320	1.8						

for those with a somewhat younger head. However, for the automobile both dollar and percentage expenditures are lower. Again it appears that transportation expenditures are more discretionary, perhaps responding more to the income constraints of the elderly in the young-old period (65-74 years of age) and additionally to physical limitations in the old-old period (over 74 years of age). However, in-home energy costs are less flexible, and so budget allocations must go up as incomes go down even after some adjustments downward in dollar expenditures are made.

Another way to look at age versus household size as affecting energy expenditures is to examine expenditures on a per capita or a per room basis. Both of these approaches can help by controlling those factors which are known to be the most determinant of household energy consumption - size of house and size of household. For this we return to the first data base which includes all age groups.

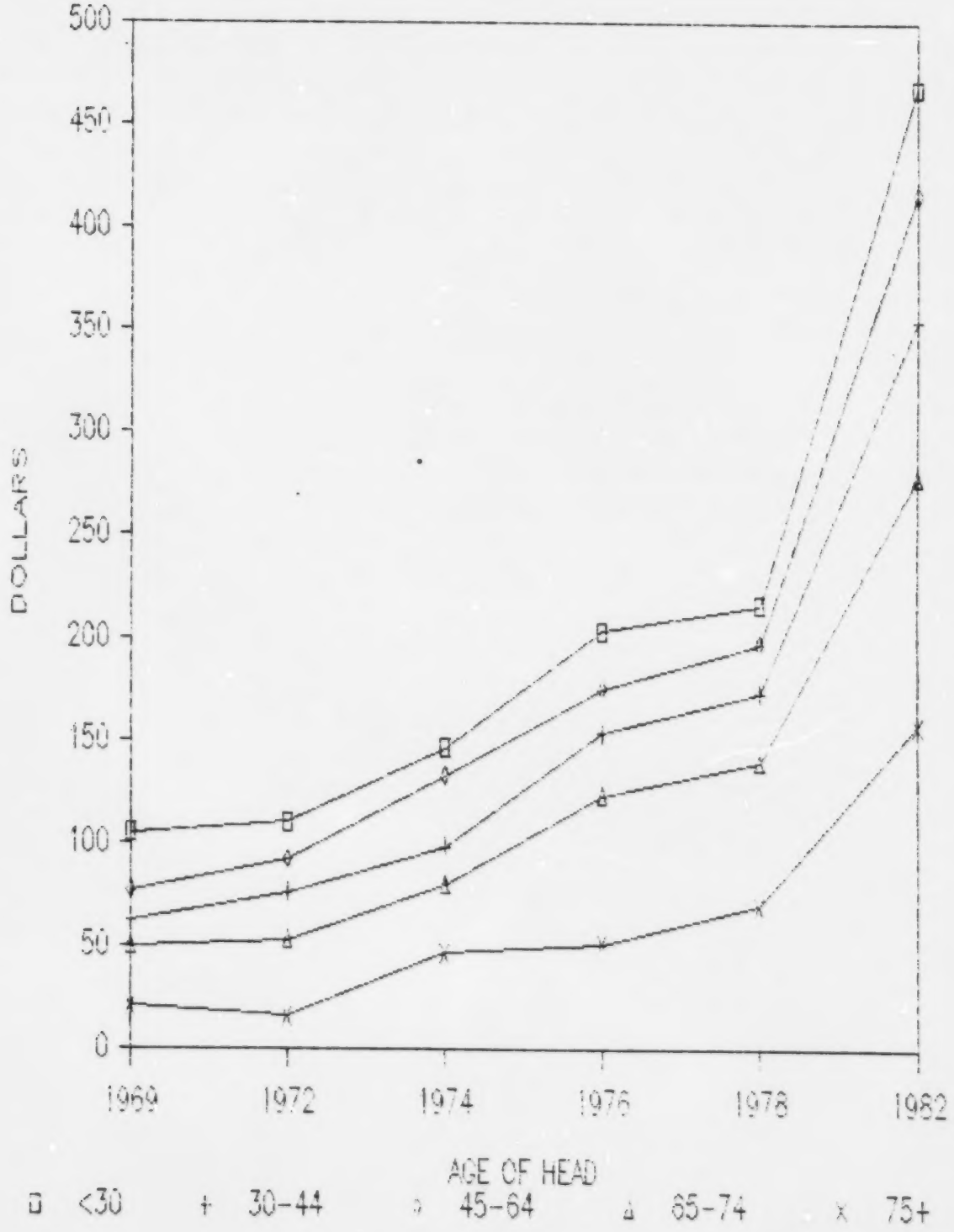
Per capita energy costs associated with automobile use for each of the six survey years shown in Table 5 and Figure 8 follow a zig-zag pattern with age. Consumption on a per capita basis was highest for the youngest and the middle-aged households. As earlier indicated, this is probably due to the presence and ages of children in the household. Young children seem to constrain travel. However, the other factor operating is age. The senior citizen is frequently retired and does not use a car to travel to work. So a major drop occurs at age 65 in transportation direct fuel cost for this and likely other reasons. The drop is less pronounced as seen earlier for married couples. There is some indication that over time as the health and vigour of senior citizens is increasing especially among the young-old, interests outside the home of this group will increase their fuel consumption to levels comparable to pre-retirement periods. Also more recent birth cohort groups of seniors have had a full lifetime of driving and are not so likely to change their patterns during early retirement. (See Heslop 1985.) Transportation per capita fuel expenditures during the thirteen-year period increased by over 450% to almost 650% for the two groups of seniors as opposed to 345% to 471% for the three groups of younger householders. Despite these large percentage increases by the elderly the dollar gap between the young and the old is

TABLE 5

PER CAPITA TRANSPORTATION ENERGY EXPENDITURES IN DOLLARS
BY AGE OF HOUSEHOLD HEAD, 8 CITY SAMPLE, 1969-1982

Age of Head	30	30-44	45-64	65-74	75 & Over
Dollar Expenditures					
1969	105	62	77	50	21
1972	110	76	92	53	16
1974	146	98	133	80	47
1976	203	153	175	123	51
1978	216	173	197	139	70
1982	468	354	416	278	157
% Change 1969-1982	345.7	469.9	438.1	452.1	646.5

FIGURE 8
PER CAPITA TRANSPORTATION ENERGY EXPENDITURES IN DOLLARS
BY AGE OF HOUSEHOLD HEAD, 8 CITY SAMPLE, 1969 - 1982



increasing. The elderly then seem to be interested in greatly expanding their use of their cars, however, in dollar terms with limited incomes they can not match the increases assumed by other age groups, especially during periods of rapid price inflation.

Now turning to energy use in the home, Table 6 and Figure 9 present the results on a per capita basis from those who pay for their own in-home energy. With this data it is more obvious than with any of the previous information that the elderly face a particular problem. In-home energy costs rose continuously with age after 30 and took substantial jumps with old age. One reason may be that warmer temperatures are needed by the elderly in their homes and the resulting higher heating bills account for these higher in-home energy expenditures per capita. Another possibility is that the elderly may occupy more space per person than do younger households. Many elderly choose to stay in the family home despite the decline in family size. The resulting fuel bills are very high on a per capita basis, even if measures are taken in the home to shut off rooms that are little used. Also the houses owned by the elderly are usually part of the older stock of homes and as such are less well insulated and with less fuel efficient heating systems.

Table 7 supports the larger home basis for higher per capita cost by presenting data on energy costs per room, also controlling on climate effects with a degree-day adjustment. There are only very small differences in the average costs of energy used per room per degree day in the home by households with different aged heads. Therefore, the per capita differences must be related to the differences in rooms per capita occupied at different ages.

The similarities in per room per degree day data for different aged households is especially true prior to 1978. In 1978 and 1982, however, the expenditures per room are higher for those households with heads 45 and older. Therefore, in recent years, in-home energy costs have been higher for the elderly on both a per capita and on a per room basis than they have been for younger households, despite the very limited economic resources of these older households to absorb the higher expenses.

TABLE 6

PER CAPITA IN-HOME ENERGY EXPENDITURES BY AGE OF HOUSEHOLD HEAD

8 CITY SAMPLE, 1969-1982

Age of Head	30	30-44	45-64	65-74	75 & Over
Dollar Expenditures					
1969	99	84	106	153	166
1972	122	92	124	182	197
1974	144	120	160	209	241
1976	207	175	212	328	311
1978	251	215	278	422	440
1982	420	404	510	667	742
% Change 1969-1982	322.5	382.4	381.0	337.0	347.3

FIGURE 9
PER CAPITA IN-HOME ENERGY EXPENDITURES IN DOLLARS
BY AGE OF HOUSEHOLD HEAD, 8 CITY SAMPLE, 1969-1982

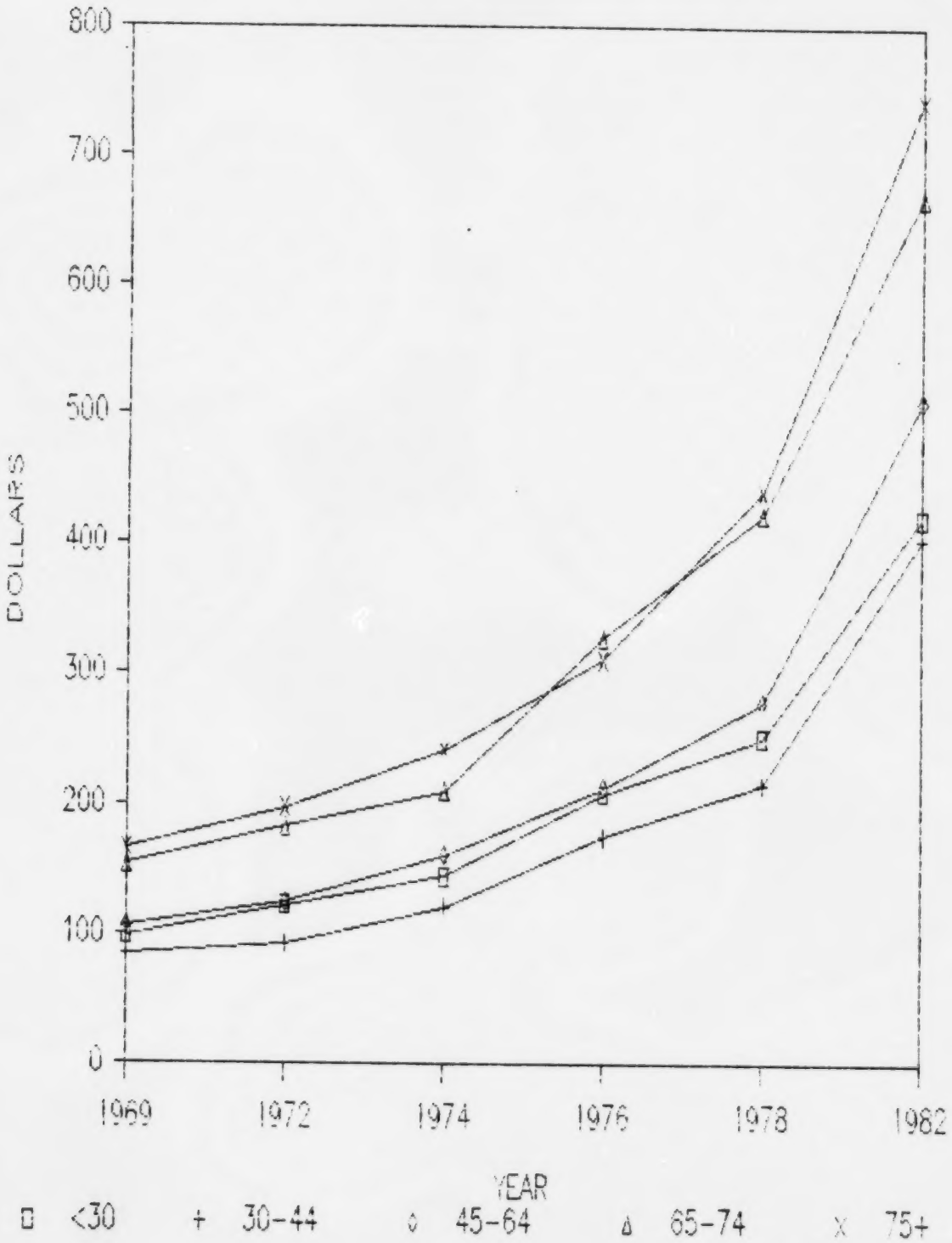


TABLE 7

PER ROOM PER 1000 DEGREE DAYS ENERGY EXPENDITURES IN DOLLARS

BY AGE OF HEAD, 8 CITY SAMPLE, 1969-1982

Age of Head	30	30-44	45-64	65-74	75 & Over
Dollar Expenditures					
1969	12.6	13.3	13.1	13.1	12.3
1972	12.6	14.2	14.0	14.3	15.3
1974	17.1	18.7	18.9	17.4	18.4
1976	22.8	23.7	24.0	24.0	23.2
1978	27.0	27.2	29.6	31.8	29.3
1982	41.9	47.9	50.4	49.0	51.7
% Change 1969-1982	233.3	260.2	286.0	275.1	319.2

ENERGY CONSERVATION AND THE ELDERLY

The recent higher per room in-home energy expenditures of the elderly may suggest that they are less likely than younger households to undertake home energy conservation activities promoted by governments and encouraged by energy price increases in the last few years. Those in younger households are generally less susceptible to the ill effects of reduced house temperatures and also may see more investment returns from insulating their dwellings that they may occupy for much longer futures.

Over the thirteen-year period under study, there have been very rapid increases in the prices of various energy sources. The final rows in both Tables 6 and 7 indicate the percentage increases of each of the age groups in per capita and per room per degree day in-home energy expenditures. The elderly have managed to keep their per capita increases among the lowest of any of the groups. They have not in this sense upgraded their energy utilization or energy standard of living. However, on a per room basis they have experienced the largest increases. It is again proposed that this reflects the real limitations they face in their ability to decrease temperatures in their homes. It likely also reflects more limited efforts to modify their homes to restrain such cost increases.

Home insulation efforts require both capital investments in insulation materials and either the ability to do-it-yourself or the ability to hire help to install such materials. These costs can be very substantial, particularly because of the size and condition of the houses usually owned by the elderly. The knowledge and physical ability for do-it-yourself installation are more limited in the senior population especially among the old-old and especially because many of the senior households consist of elderly women living alone. Moreover, on a cost recovery basis, the large investments needed to upgrade housing standards and reduce energy costs may not be justifiable if the elderly person anticipates that he/she will not continue to own the home for an extended period of time. The probability of death or relocation to other private or public housing facilities in the near or intermediate-term future argue against making such investments. Support from government-sponsored

programmes may encourage such insulation upgradings and the modernizing of heating systems. However, such support programmes have to be perceived as accessible and useful by potential users. The elderly may be less likely to access the funds in government support programmes without some assistance to overcome the "red tape" involved. Also the elderly are often the targets of shoddy workmanship and fraudulent practices of unethical home improvement contractors. Some protection would likely be needed to ensure that grant monies given to the elderly did go for high quality materials and installation for maximum effect.

OFF-OIL

In 1981, the Canadian government announced grants to aid homeowners in converting heating systems away from oil as a fuel source. The so-called "Off-Oil" or COSP (Canadian Oil Substitution Programme) grants proved to be one of the most effective energy management programmes aimed at households. However, again the question arises as to how the elderly have responded. Have they made substantial moves to convert away from heating their homes with the most price-sensitive fuel? Has this programme helped them to control rising energy expenditures?

Table 8 presents information from the expenditure surveys concerning the fuel on which the households spent the most money in each year. In 1969, over half of seniors spent their largest amount of in-home energy dollars on oil. At this same time less than a third of households with heads under 45 did so. These younger households were evenly spread among all major fuels.

Little change is seen in the distribution pattern across fuel types until 1976. By that time Canadians had experienced their first interruption in oil flows due to Middle East tensions and the first round of major price hikes due to the emergence of OPEC (the Organization of Petroleum Exporting Countries). These major events occurred in the winter of 1973-74 and would not impact on 1974 data in terms of fuel changes. However, by 1976 the percentage of the youngest households whose major in-home energy source was oil had dropped below 30%, a decline of almost 3½%. Similar drops can be seen for all age groups with most of the increase occurring in gas energy expenditures.

TABLE 8
PERCENTAGE OF HOUSEHOLDS WITH HIGHEST ENERGY EXPENDITURE
FOR EACH TYPE OF FUEL BY AGE OF HOUSEHOLD HEAD

Age of Head		30	30-44	45-64	65 & Over
Year	Type of Fuel With Highest Expenditure				
1969	Oil	32.9	32.9	42.8	50.8
	Gas	34.6	38.0	31.2	32.2
	Other	32.4	29.1	26.0	17.0
1972	Oil	31.8	33.6	40.8	50.3
	Gas	30.8	33.1	30.7	29.1
	Other	38.1	33.2	28.5	20.6
1974	Oil	32.9	34.8	44.0	48.8
	Gas	39.3	37.0	33.1	31.7
	Other	27.9	28.2	23.0	19.5
1976	Oil	29.5	32.3	41.8	44.2
	Gas	40.8	39.8	37.4	39.1
	Other	29.8	28.0	20.8	16.7
1978	Oil	26.5	31.5	43.0	48.5
	Gas	41.8	38.1	31.6	35.1
	Other	31.7	30.4	25.4	16.4
1982	Oil	14.2	22.9	29.8	41.4
	Gas	48.8	48.1	46.7	40.1
	Other	37.0	28.9	23.5	18.5

Further and even greater oil price increases occurred in the late 1970's. As earlier mentioned, the federal government directly encouraged reductions in the use of oil in the home between the 1978 and 1982 survey years. However, the response to these changes were smaller in the households of seniors than for any other age group. A 7% drop in seniors with main fuel as oil occurred between 1978 and 1982, but there had been a rise of 4% between 1976 and 1978. So between 1976 and 1982 there was less than a three percentage point drop in the proportion of elderly households whose principal fuel was oil. However, during the same period a drop of over 15% occurred in the proportion of youngest households using mainly oil. Similar large drops of about 10% and 12% occurred in the figures for those households with heads aged 30-44 and 45-64 respectively. The elderly households were the least moved. In all these cases the largest portion of these declines occurred between the last two survey periods and during much of this time the COSP programme was operating.

There are probably many reasons why these results are seen. Some have been alluded to earlier. The elderly may not see the advantage to major heating system renovations if they do not anticipate remaining in their homes for long periods of time. More generous incentive grants for the elderly may be needed to make the change a good investment. Elderly householders may be more sceptical of the advantages of conversion and more conservative in approach to such changes. They may also feel less capable of overcoming the hurdles involved in the fairly complex process of determining the most cost-effective fuel for their homes, selecting a good contractor, completing all the necessary forms and contracts to get the job done and applying for the governments grants.

On the other hand, younger householders may more easily see the financial benefits of acquiring a cheaper-to-operate heating system. They are more likely than the eldery to be changing houses, and when buying accommodation they are more likely to seek out such heating systems and to find them in newer housing stock. They are also more likely to feel capable of filling out all the forms required to apply for government grants for conversions.

The bottom line seems to be that the elderly in their own homes are caught with difficult to heat structures that for health and survival reasons they must maintain at warm temperatures. The existing heating systems often use one of the most costly and price-volatile fuels. However, switching off it is more difficult for them than those of any other group. The result is that their in-home energy costs are rising faster than for any other age group and larger and larger chunks are being eaten up out of their limited budgets just to keep them warm.

Conclusions

There is no doubt that the elderly have been harder hit than the non-elderly by energy price increases. Although there is some indication that lifestyle improvements in the form of increased energy consumption have been constrained, basic needs for energy in the home have meant that major additional costs have had to be absorbed. Due to rapidly rising energy costs then the elderly have lost ground in efforts to reduce budget proportions allocated to necessities. On average, they must spend more than 3-4% more of their budgets than other households with younger heads. There is also evidence that they are far less likely than younger groups to be able or willing to make the adaptions necessary to protect themselves from further energy price shocks. As a group they are far more dependent than others on high-cost, dwindling oil supplies for heating their homes. If this situation is to be changed, specifically targeted and comprehensive support programmes would have to be devised. Otherwise, fuel subsidies may be the only way to alleviate the burdens of high energy costs and protect against future increases.

FOOTNOTES

1. For detailed information on the construction of the data sets used in this study, contact the Social and Economic Studies Division of Statistics.

2. Degree-days are determined as the number of days of temperatures below 18° celsius. The information on degree-days for each year for the cities used in the study was obtained from Environment Canada and added to the expenditures data set.

REFERENCES

Avery, W. Moulton (1984), "Hypothermia and Heat Illness", Aging, April-May, No. 344.

Cumming, E. and Henry, W.E. (1961), Growing Old: The Process of Disengagement, New York: Basic Books.

Heslop, Louise A. (forthcoming), "A Picture of Aging - Expenditure Patterns of the Elderly in Canada, 1969-1982" - Monograph, Ottawa: Social and Economic Studies Division, Statistics Canada.

Heslop, Louise A. (1985), "An Analysis of Expenditure Patterns of the Elderly, Cohorts - Going Through Life Together", Research Paper, Ottawa: Social and Economic Studies Division, Statistics Canada.

McPherson, Barry D. (1983), Aging as a Social Process, Toronto: Butterworth Publishers.

Robson, Paul (1982), "Patterns of Activity and Mobility Among the Elderly" in A.M. Warnes, ed., Geographical Perspectives on Aging, New York: John Wiley and Sons Ltd.

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